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ABSTRACT

A review course (RTC) for the Georgia Board of Regents' Reading Test (GRT) is provided in most institutions in Georgia's university system to help students who have not passed the GRT before they have earned 50 cumulative semester hours. A study was conducted to determine how RTC students' levels of test anxiety, as measured by the Test Anxiety Inventory (TAI) (C. Spielberger, 1979) may affect their scores on the GRT, and whether anxiety-reduction training could improve the scores of anxious students. Of 90 RTC students, 79 completed the TAI pretest, 70 completed the TAI posttest, and 84 took the GRT. Rational Emotive Therapy (A. Ellis, 1962) was used in anxiety-reduction training. Although there were variations in student adherence to anxiety-reduction strategies, findings support the proposition that anxiety-reduction training prior to the GRT facilitates improvement in test scores for anxious students. Pretest and posttest results showed that as anxiety rose, GRT scores declined. Anxiety-reduction training will be recommended for students with high anxiety about the GRT. An appendix contains the TAI. (Contains 3 tables and 11 references.) (SLD)

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**TEST ANXIETY AND EFFECT OF ANXIETY-REDUCTION
TRAINING ON STUDENTS' PERFORMANCE ON THE
GEORGIA REGENTS' READING EXAM**

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TEST ANXIETY AND EFFECT OF ANXIETY-REDUCTION TRAINING ON STUDENTS' PERFORMANCE ON THE GEORGIA REGENTS' READING EXAM

A review course for the Georgia Board of Regents' Reading Test (GRT) is provided in most institutions within Georgia's University System for the purpose of providing instruction in test-taking and reading comprehension strategies for students who have not passed the test before they have earned 50 cumulative semester hours. For many years, and often with substantial frustration, instructors at this regional university have worked with students who have repeatedly failed to pass the GRT. Historically, pass rate for these students has been discouraging, often with less than half of the students in the RTC passing the GRT after completing the course. At this institution, students are allowed extra time on the GRT when their RTC instructors document their test anxiety. Documentations have generally been arbitrarily provided with little support for the anxiety claim except the student's frustration with recurring failure on the GRT and the completion of multiple review courses.

Purpose of the Study

The purpose of the present study was to determine how the RTC students' level of test anxiety as measured on the Test Anxiety Inventory (Spielberger, 1979) may affect their scores on the GRT and whether or not anxiety-reduction training prior to the test would improve the scores of anxious students. The study is unique in at least two ways: (a) the outcome measure (GRT) for the anxiety-reduction training is an actual exam rather than a survey instrument to measure test anxiety; and (b) the students in the experimental group did not come seeking counseling for test anxiety. Rather, the counselor and professor proposed test anxiety treatment to the class members.

Method

Subjects

Of the 90 students enrolled in the RTC class sections, 37 males and 42 females completed the TAI-pre, 30 males and 40 females completed the TAI-post. Eighty-four of the students took the GRT after the review course was ended. The average student age was 23 years.

Procedures

Five class sections of approximately 20 students each met eight hours per week for four weeks prior to the GRT testing day, Spring, 1998. Students in all (both experimental and control conditions) of the RTC sections were instructed in test-taking strategies with the use of practice test passages and supplementary exercises designed to strengthen these reading skills. Class activities included individual and group exercises with emphasis on vocabulary development, literal and inferential comprehension and analytical comprehension. One RTC instructor invited a university counselor to meet with her class (the experimental group) once weekly to implement treatment approaches for reducing test anxiety in group settings with college students, specifically, Rational Emotive Therapy (Ellis, 1962) and Cognitive Restructuring (Goldfried, Linehan, & Smith, 1978). Because RET application discussions include personal, emotionally-laden topics, confidentiality and students' agreement to participate were maintained and secured. RET applications included interactions in which students supported, challenged, and shared

insights related to each others' test anxiety. Students were offered the opportunity to work with the RTC instructor outside the classroom if they did not wish to participate in the anxiety-reduction sessions. No students chose this option. Except for a short presentation by one of the university counselors concerning general test anxiety, the other instructors of the RTC did not implement anxiety-reduction instruction in their classes (the control groups). The anxiety-reduction training combined RET discussion and application sessions with relaxation training and systematic desensitization. Homework assignments included practice of the RET process in a daily journaling format. Additionally, students were instructed to practice the relaxation technique daily. Students in all RTC classes completed the Test Anxiety Inventory (TAI) at the beginning and at the end of the RTC, then took the GRT four days after the course ended.

Anxiety-Reduction Training

Test anxiety, defined by Dusek, in 1980 is "an unpleasant feeling or emotional state that has psychological and behavioral concomitants, and that is experienced in formal testing or other evaluative situations" (p. 88). Test anxiety has been shown to be one of the most important negative motivators in education and has direct, sometimes debilitating effects on school success (Hill & Wigfield, 1984). The two primary treatment approaches applied to reducing test anxiety in group settings of college students fall into the categories of cognitive and behavioral therapies (Zimpfer, 1986). Among cognitive approaches, Rational Emotive Therapy (RET) (Ellis, 1962) and cognitive restructuring (Goldfried, Linehan, & Smith, 1978) have been evidenced as effective in reducing test anxiety (Holyroyd, 1976). Among behavioral approaches, both relaxation training and systematic desensitization have been evidenced as effective in reducing test anxiety (Dole, Rockey, & diTomasso, 1983; Knapp & Mierzwa, 1984). Additionally, cognitive and behavioral approaches have been found as much, or more effective, in combination (Zimpfer, 1986). Barabasz & Barabasz (1981) showed that RET is effective in decreasing anticipatory anxiety, but is not effective with decreasing the anxious arousal associated with the actual inability to answer exam questions. Therefore, the present study included use of a combination of RET with behavioral techniques with the objective of allowing students to enter the exam with appropriately low anxiety as well as the capacity to relax during the GRT to reduce the anxious arousal they often feel when they are unable to answer a question.

Instruments

The TAI is a well-used and researched self-report psychometric scale developed to measure individual differences in test anxiety in high school and college students (Spielberger, 1972; Spielberger, Gonzalez, Taylor, Algaze, & Anton, 1978). The one page questionnaire includes directions, twenty items and areas for recording responses. Response choices are: (1) almost never, (2) sometimes, (3) often, and (4) almost always. "Almost never" suggests low test anxiety and is always scored "1"; "Almost always" indicates high test anxiety and is always scored "4." (The scoring weights are reversed on Item One only.) All twenty items are used to determine the TAI Total Score. The minimum TAI Total Score (very low if any anxiety) is 20. The maximum TAI Total Score (very high anxiety) is 80. Students who complete the TAI are asked to report how frequently they experience anxiety symptoms before, during, and after tests. In this study, students were asked to respond to the inventory items with regard to their experiences with the GRT. See Appendix A for a copy of the TAI.

Normative data for the TAI is based on the responses of 1,449 undergraduates from the University of South Florida. Percentile ranks and normalized T-scores for male and female college undergraduates, freshmen, community college, and high school students are reported in the TAI Manual. The reported TAI Total Scores for females are consistently three to five points higher than those of the male counterparts in the four samples. Test-retest reliability coefficients of the TAI Total scale for time periods varying from two weeks to six months indicate reliability coefficients at .80 or higher. Shorter time intervals yielded the higher reliability coefficients. The alpha coefficients for the normative samples indicate internal-consistency reliability of the TAI. Alphas for the TAI Total scales were uniformly high for both males and females (.92 or higher) when computed by Kuder-Richardson Formula 20, modified by Cronbach (1951). The TAI correlates highly with six other anxiety measures. In sum, research results indicate that the TAI provides reliable and valid measures of test anxiety as a situation-specific personality trait.

The GRT is a multi-form college reading comprehension test comprised of ten reading passages with five to eight questions each in a 60-item, multiple-choice format. Passages on the test usually range from 175 to 325 words in length and are drawn from a range of disciplines, e.g. social science, humanities, and natural science. Test items assess four important reading competencies - knowledge of vocabulary meaning in context, literal and inferential comprehension, and textual analysis of structure and format. See Appendix A for copy of a sample GRT passage. Actual test passages are not available for review.

Data Analysis

Descriptive statistics, t-tests, and one-sample chi-square tests were used to compare students in the experimental and control groups on levels of test anxiety and scores earned on the GRT.

Results

Some students in the experimental group reported adherence to instructions for journaling, relaxation technique practice, and self-care as instructed. There was a wide variance between strict and near non-existent adherence to instructions. Students reporting adequate to strict adherence to instructions for out of class assignments passed the GRT. Students reporting near non-existent adherence did not pass the GRT. Several students reported success applying learned anxiety management skills to other aspects of their lives.

The means and standard deviation for all students' scores on the TAI and the GRT are presented in Table 1.

TABLE 1.

Means and Standard Deviations for All Students on the TAI pre- and TAI post- Total and Change Scores, GRT, and Most Recent Prior GRT Scores.

Variables	n	M	SD
TAI-pre Total Anxiety Score	79	46	16
TAI-post Total Anxiety Score	70	44	15
TAI Total Change (Matched)	59	-1.90	10
GRT Score (Spring, 1998)	84	70	9
Most Recent Prior GRT Score	67	56	4

The means and standard deviation on these same variables for the one experimental and four control conditions are presented in TABLE 2.

TABLE 2.

Means and Standard Deviations for Experimental and Control Groups on the TAI pre- and TAI post-, Total and Change Scores, GRT, and Most Recent Prior GRT Scores.

Variables	Experimental Group			Control Groups		
	n	M	SD	n	M	SD
TAI-pre Total Anxiety Score	18	51	13	61	44	16
TAI-post Total Anxiety Score	13	41	11	57	45	16
TAI Total Change (Matched)	12	-10	7	47	0.1	9
GRT Score (Spring, 1998)	16	63	9	68	62	9
Most Recent Prior GRT Score	15	57	3	52	55	4

The mean score for the experimental subjects reliably exceeded that for control subjects on the TAI-pre Total Score ($F = 1.73$, $df = 1/77$, $p = .09$) but did not exceed scores for control subjects on the TAI-post Total Score. The mean change difference for the experimental subjects (-10) also reliably exceeded that for control subjects (.1) on the TAI Total Change (Matched) Variable ($F = 3.35$, $df = 1/57$, $p = .001$). There was not a statistically significant difference on the GRT scores for the experimental and control conditions, nor was there a statistically significant difference on the Most Recent Prior GRT for the experimental and control conditions.

The TAI pre- mean score for males (42 ± 13) and females (50 ± 17) differed significantly ($F = 2.31$, $df = 1/77$, $p = .02$). Likewise, the mean score for males (38 ± 13) and females (49 ± 15) differed significantly on TAI post- mean scores ($F = 3.06$, $df = 1/68$, $p = .003$). In order to determine relationships between test anxiety and the students' GRT scores, Pearson product-moment correlations were calculated. Inter-correlations between variables are included in TABLE 3.

TABLE 3.

Pearson Product-Moment Inter-correlations for All Students for TAI and GRT Scores.

Measures of Anxiety	GRT (Most Recent Prior Score)	GRT (Spring, 1998)
TAI-pre Total Score	-0.01	-0.42 ^{***}
TAI-post Total Score	-0.11	-0.41 ^{***}
TAI-Change Variable	-0.07	0.89

(^{***} $p < .001$)

Discussion

Findings support the proposition that anxiety-reduction training prior to the GRT facilitates improvement in test scores for anxious students. First of all, the highly significant negative correlation between the TAI post- Total scores for all students and the GRT scores indicates that as anxiety goes up, GRT scores go down. Secondly, the students in the experimental group scored significantly higher on the TAI-pre than the students in the control conditions, yet they were not different on the TAI-post or on the GRT scores after the course was over. Thus, it appears that the anxiety-reduction training contributed to the experimental group's improved scores on the GRT. Since experimental and control groups' most recent prior GRT scores did not differ significantly, an analysis of co-variance was not used to control for effect of prior scores on the GRT, Spring, 1998.

Females scored higher on the TAI-pre and TAI-post indicating that females were more anxious about the GRT than the males in the study. This supports the findings of the TAI authors who found that TAI Total scores for females were consistently 3 to 5 points higher than those of the male counterparts in four norming samples. High school and community college females had the highest TAI total scores.

Because findings indicate a strong negative relationship between high anxiety and the students' GRT scores and imply a positive effect of the anxiety-reduction training, the anxiety-reduction training will be recommended for students with high anxiety for the GRT as assessed on the TAI. Subsequent current research is investigating the relationship between anxiety and GRT score among students who are not required to take the RTC.

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APPENDIX A: TAI Test Form

NAME _____ DATE _____ SEX M F

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

T _____ W _____ E _____

ALMOST NEVER
SOMETIMES
OFTEN
ALMOST ALWAYS

- | | | | | |
|--|---|---|---|---|
| 1. I feel confident and relaxed while taking tests | ① | ② | ③ | ④ |
| 2. While taking examinations I have an uneasy, upset feeling | ① | ② | ③ | ④ |
| 3. Thinking about my grade in a course interferes with my work on tests | ① | ② | ③ | ④ |
| 4. I freeze up on important exams | ① | ② | ③ | ④ |
| 5. During exams I find myself thinking about whether I'll ever get
through school | ① | ② | ③ | ④ |
| 6. The harder I work at taking a test, the more confused I get | ① | ② | ③ | ④ |
| 7. Thoughts of doing poorly interfere with my concentration on tests | ① | ② | ③ | ④ |
| 8. I feel very jittery when taking an important test | ① | ② | ③ | ④ |
| 9. Even when I'm well prepared for a test, I feel very nervous about it | ① | ② | ③ | ④ |
| 10. I start feeling very uneasy just before getting a test paper back | ① | ② | ③ | ④ |
| 11. During tests I feel very tense | ① | ② | ③ | ④ |
| 12. I wish examinations did not bother me so much | ① | ② | ③ | ④ |
| 13. During important tests I am so tense that my stomach gets upset | ① | ② | ③ | ④ |
| 14. I seem to defeat myself while working on important tests | ① | ② | ③ | ④ |
| 15. I feel very panicky when I take an important test | ① | ② | ③ | ④ |
| 16. I worry a great deal before taking an important examination | ① | ② | ③ | ④ |
| 17. During tests I find myself thinking about the consequences of failing | ① | ② | ③ | ④ |
| 18. I feel my heart beating very fast during important tests | ① | ② | ③ | ④ |
| 19. After an exam is over I try to stop worrying about it, but I just can't. | ① | ② | ③ | ④ |
| 20. During examinations I get so nervous that I forget facts I really know | ① | ② | ③ | ④ |

PASSAGE ONE

There is no such thing as a cardiac pacemaker manufactured especially for pets. But a recycled made-for-humans model originally worth as much as \$4,000 can be implanted in an animal for less than a tenth that amount. Tilley estimates that between two and three hundred dogs and a handful of cats are now padding around the country by the grace of pacemakers, and probably another hundred or more will have the surgery this year.

Dogs can succumb to some of the same disorders of heart rate and rhythm that affect humans. The heart's natural pacemaker, a little bundle of specialized nerve cells, shoots out regular electrical impulses that control the heart's rate of contraction. But breeds from miniature poodles to Saint Bernards can fall victim to heart block, a condition that causes the heart to beat at about a third or less its normal rate because some of the tissue that either initiates or conducts the pacemaker's natural rhythm has been destroyed by disease.

Such heart blocks are debilitating and often fatal. In an extreme case, the heart will finally stop, but prior to that the ailing pet will become listless because insufficient blood is being pumped to the brain. It will loll around and occasionally faint. Fluid buildup in the lungs may cause the animal to cough and wheeze.

If drugs fail, the one quick fix for humans or dogs is an artificial pacemaker. Its hermetically sealed, battery operated generator, implanted just under the skin, sends regular electrical pulses along a wire to the heart; each pulse tells the muscular pump to beat. For people, the devices are set to pulse at normal human heart rate -- approximately 70 beats per minute. The same pacemakers, simply reset to suitable canine speeds -- usually from 80 to 100 beats per minute -- can be used in dogs.

1. The author's opinion about pacemakers is that they
 1. are too valuable to be wasted on pets.
 2. cause needless suffering in pets.
 3. may be put to good use in pets after being used in humans.
 4. should be developed specifically for pets.
2. According to the passage, what is a heart block?
 1. a blockage of blood flow to the heart
 2. a heart rate disorder
 3. a disease of heart valves
 4. an artificial pacemaker malfunction
3. Why do some pets with heart disease become listless?
 1. An inadequate supply of blood reaches their brains.
 2. Rapid electrical impulses disorient them.
 3. Their nerves become too sensitive.
 4. They are sedated by medication.
4. Artificial and natural pacemakers both
 1. can be restored by drugs.
 2. consist of bundles of nerve cells.
 3. reduce the rate at which the heart beats.
 4. send electrical impulses.
5. The underlined word debilitating most nearly means
 1. stimulating.
 2. deadly.
 3. artificial.
 4. weakening.
6. Compared to pacemakers used in humans, pacemakers used in dogs cost less because dog pacemakers
 1. are easier to regulate.
 2. are less dangerous to implant.
 3. are usually smaller.
 4. have already been used.

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SCORING AND INTERPRETATION

PASSAGE 1				PASSAGE 2				PASSAGE 3			
ITEM	KEY	CLASS	PROB AT 61	ITEM	KEY	CLASS	PROB AT 61	ITEM	KEY	CLASS	PROB AT 61
1	3	I	.9	1	2	V	.8	1	1	L	.3
2	2	L	.7	2	2	I	.5	2	1	I	.3
3	1	L	.9+	3	2	I	.9	3	2	V	.7
4	4	L	.9	4	4	I	.4	4	2	V	.6
5	4	V	.7	5	3	A	.8	5	4	A	.8
6	4	I	.8	6	1	I	.9				

PASSAGE 4				PASSAGE 5				PASSAGE 6			
ITEM	KEY	CLASS	PROB AT 61	ITEM	KEY	CLASS	PROB AT 61	ITEM	KEY	CLASS	PROB AT 61
1	1	I	.8	1	1	L	.5	1	4	V	.6
2	4	I	.7	2	3	I	.5	2	2	V	.7
3	1	I	.7	3	2	I	.5	3	3	L	.5
4	1	I	.7	4	4	A	.4	4	3	A	.8
5	1	L	.9+	5	1	A	.9	5	3	A	.4
6	2	V	.8	6	1	I	.7				

The "Class" column indicates the skill classification of the item: Vocabulary, Literal, Inferential, or Analysis.

The "Prob at 61" column provides an estimate of the probability that an examinee with a Regents' Test score of 61, the minimum passing score, would answer the item correctly. A low value indicates that most minimally passing students would not be expected to answer the item correctly, while a high value indicates that most minimally passing students would be expected to answer the item correctly.

The passages may be administered separately and discussed with students for practice. They may also be administered as three-passage mini-tests (the first three passages and/or the last three passages) or as a six-passage mini-test. Scores on the mini-tests have low reliability because of the small numbers of items. They may be interpreted as follows:

Passages 1, 2, and 3 (17 items) Scores of 15 and above correspond to passing scores on the regular Regents' Test score scale. Scores of 10 and below correspond to failing scores. Scores of 11 through 14 are within 1.5 standard errors of measurement of the minimum passing score and should not be interpreted as either passing or failing.

Passages 4, 5, and 6 (17 items) Scores of 15 and above correspond to passing scores on the regular Regents' Test score scale. Scores of 9 and below correspond to failing scores. Scores of 10 through 14 are within 1.5 standard errors of measurement of the minimum passing score and should not be interpreted as either passing or failing.

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Passages 1 to 6 (27 items) Scores of 27 and above correspond to passing scores on the regular Regents' Test score scale. Scores of 20 and below correspond to failing scores. Scores of 21 through 26 are within 1.5 standard errors of measurement of the minimum passing score and should not be interpreted as either passing or failing.